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Risk Communication: Toward A Better Informed Public

Myron D. Johnsrud, Administrator, Extension Service, USDA

A better understanding of risk communication, assessment, and management is critically important to the progress we make with many of our national initiatives. Water quality, food safety, and perhaps dimensions of waste management may require our special attention. This understanding is also important to our base programs related to environmental management.

Risk communication, assessment, and management clearly are topics that can only be addressed with a melding of scientific understanding from several disciplines, including the social sciences. They are also a recognition of our need to improve the ability to perform our educational role in a politically and emotionally charged environment.

When discussing food safety, I like to quote Dr. Leon Kass, a Professor at the University of Chicago: "Politics is always about moral questions. For better or for worse, in a liberal democracy, those expressions of the beliefs and practices and values of the community are best expressed through serious discussion with the populace in the legislature and in local communities."

Dr. Kass believes it likely that a rather small number of these matters require legislation. He highlights the importance of leaving room for the prudent judgment of decent people.

Room For Best Judgment

Dr. Kass also emphasizes that, "The attempt to provide rules and institutions to solve these problems, however well intentioned, is finally foolish. One must ultimately leave room for judgment and conscientiousness—maybe not a perfect judgment, but the best under the circumstances."

Extension Leader, and Associate Professor Clifford Scherer, Department of Communication, Cornell University, points out that some see the major issue behind risk communication as a battle over **control** of food and water policy. Will policy be set based on good science, or will it be set at the whim of consumer opinion? Will pesticides be restricted or removed from the market simply because a segment of the population does not want them used, even though science says the risks are nearly zero?

Others see the major issue as conflict between agriculture and uninformed consumers—those who don't understand the importance of pesticides in producing our abundant supply of foods.

Helping To Forge Better Decisions

Regardless of how the conflict is viewed, it is critical to Extension but, more importantly, it is critical to consumers. The public does have the right and the responsibility to participate in policy decisions that impact them. As an educational organization, Extension has a responsibility to help people make better decisions with a full understanding of the alternatives and consequences.

From our position as educators and scientists, we must also acknowledge that we can improve our abilities to communicate, engage, and make complex issues more understandable.

Most people have a greater fear of those risks they can't control, such as additives in processed foods. For example, a recent study found that of 200 people surveyed, 60 percent associated health risks with some chemicals found in foods. Sixty percent had

Myron D. Johnsrud
Administrator, Extension Service, USDA

"a lot" of concern about pesticides and antibiotics, and 50 percent had "a lot" of concern about highly processed foods.

Lack Of Effective Communication

Risk communication has gained attention during the past couple of years primarily because we have been unable to communicate effectively the complexities of food and water risk. We have not communicated well the minimal risks existing in cases such as pesticide residues in food. We have failed to communicate the more serious risks facing consumers, such as radon in homes and bacterial food contamination.

(Continued on inside back cover)

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Cover: Bacteria such as these, visible only under a microscope, can cause food quality deterioration and food-borne illness.

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Food Safety: A Three-Pronged Approach

Michael W. Moody, Extension Food Technology Scientist, Louisiana State University

Food safety is a major issue for the 1990s, although the United States claims the safest food supply in the world. Millions of cases of food-borne illnesses are reported each year in this country, costing taxpayers billions of dollars.

Federal and state food regulatory agencies consider this issue a priority and are dedicating available resources to food safety research and educational initiatives and programs. Often, these programs are targeted to specific issues or concerns.

Consumers are increasingly concerned about the safety of commercially available foods. Thanks to an efficient, modern communications network, consumers are bombarded with events and investigations that often lead them to believe that the American food supply is unsafe or less than wholesome.

Food Safety Initiative

To address the issue of a safe food supply, the Louisiana Cooperative Extension Service established a broadly based food safety educational initiative. The program's goal—to provide consumers with timely, straightforward, and unbiased information on food safety issues and potential risk associated with those issues.

Extension considers the development and implementation of this program a priority, according to Denver T. Loupe, vice chancellor of the Louisiana State University (LSU) Agricultural Center and director of the State Extension Service.

"[illegible] effort on our part to be [illegible] providing information to our [illegible] and consumers in general on food matters that are of concern to all of us," says Loupe. "We accept the challenge to

▲ Extension materials generated by the food safety initiative are reaching producers. The owners of this catfish processing plant in Wisner, LA, work hand-in-hand with Extension educators.

▶ Cooperative Extension at Louisiana State University provides both consumers and growers with timely information on food safety issues.

provide educational programs that will help create a better understanding of the technological advances in agriculture."

Program Organization

A food safety task force at the state level, comprised of Extension specialists and parish county professionals, forms the nucleus of the program and serves as its driving force. The task force identifies the educational efforts, standards, and objectives of the program. They meet regularly for indepth discussions of food safety issues and to devise plans of action to effectively provide information to identified audiences. In addition, the task force evaluates the effectiveness of past efforts.

The task force is made up of Extension professionals, experts from state and federal government, the health industry, other industry representatives, and consumer groups. Food safety issues are contestable or emotional, and the task force works to assure that all actions, information, and recommendations reflect unbiased and scientifically sound judgment.

New Approaches

During initial meetings, the task force quickly recognized that different approaches to disseminating food safety information would be necessary. The method of communication would depend on the urgency of the situation.

The Louisiana Extension food safety program is set up to provide a tiered effort with a three-pronged approach:

- Continuous, long-term programs.
- Special periodic workshops and training.
- A mechanism for responding quickly to unexpected food safety crises.

General and recurring food safety topics and issues (such as prevention of food-borne illnesses and the basic facts for keeping foods safe) can be planned and programmed over a long period of time and conducted on an ongoing basis. Other short-term educational programs (such as food safety workshops and conferences) can also be planned and executed. These two efforts are especially important in establishing an enduring food safety program.

At the same time, the task force members recognized the importance of establishing some mechanism to respond to a food safety information crisis. In a crisis, time is the most important consideration. When a critical food safety issue unexpectedly surfaces, parish and area Extension professionals must have timely and correct information to answer questions or provide further sources of information.

The task force members determined the most effective way to prepare for a crisis was to create a directory of food safety issues. This directory would list various topics and commodities. It would also list the name of one or more qualified specialists responsible for providing appropriate responses to activities concerning each. When an urgent food safety issue occurs in a particular subject area, the specialist listed in the directory would be responsible for writing factsheets, providing supplemental information, and coordinating the response of associations and federal and state government agencies.

Extension Pipeline

The success of the Louisiana Extension food safety program relies on the Extension communication network to disseminate information effectively. Information and recommendations generated at the task force level are sent to the parish level to consumers and other audiences. Depending on the material provided, the task force helps identify audiences and target groups for parish professionals. Other outside groups, agencies, and associations needing food safety education are aware of the effectiveness and impact of the Extension "pipeline" and refer potential problems and issues to the task force.

◀ Vegetable grower awaits customers for his produce at a farmers' market in West Monroe, LA.

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Biosecurity: Safe Food From Healthy Animals

Edward T. Mallinson, Extension Veterinarian, University of Maryland

Controlling food poisoning bacteria on the farm is viewed by many scientists as critical to protecting consumers. Recent episodes with avian influenza, *salmonella newport* in ground beef, *salmonella enteritidis* in eggs, and *Listeria* in various animal foods have led to loss in consumer confidence in the food industry.

The cost of poultry diseases alone to the U.S. broiler industry was $588 million in 1988, according to Michael Morris, chair of a professional committee. The cost was triple the poultry industry's annualized housing and equipment costs of $190 million. In 1988, the turkey industry lost $222 million due to diseases—a loss six times greater than annualized housing and equipment costs.

To Restore Public Confidence

"Biosecurity is the answer," says Monte Frazier, former Extension veterinarian. "Avoid bringing animals to disease and do not bring disease to animals."

Biosecurity is the concept that is central to restoring public confidence, cutting disease losses, and reducing the cost of animal food production. It consists of those management systems and housing systems that minimize the likelihood of disease exposure. Also, if exposure does occur, it reduces the dose or frequency of exposure.

Creating Awareness

Biosecurity is an investment program with premiums paying dividends in product marketability and farm profit. Extension staffs in many states, including California, Florida, Georgia, Maryland, Minnesota, and Pennsylvania, have distributed leaflets on biosecurity.

Biosecurity programs are being established along regional lines. The Mid-Atlantic Cooperative Extension (MACE) Poultry Health and Management Unit, modeled, in part, from the long-standing regional New England Roundtable, coordinates the production, printing, and distribution of numerous biosecurity posters, leaflets, and factsheets.

Publishing Efforts

Distribution of materials on biosecurity is extensive in the MACE-participating states of Delaware, Maryland, New Jersey, New York, Pennsylvania, Virginia, and West Virginia. Recently distribution has extended to some southern and western states. MACE's publishing efforts are contributed to and used by state departments of agriculture, trade associations, and feed stores.

Hold Regional Meetings

Regional meetings are also being held on biosecurity. In December 1989, the Fourth Annual MACE Regional Meeting on Poultry Biosecurity was held at the University of Delaware campus in Newark. This meeting was coordinated by Cooperative Extension specialists Owen Keene, the Penn State University; Dan Palmer, University of Delaware; and Charles Wabeck, University of Maryland.

Such interstate collaboration promotes credibility, but which strategies are most effective in modifying behavior?

"We need to understand that economic considerations are most likely to motivate people to change," says Marjorie E. Jensen, Extension specialist, University of Rhode Island-Kingston. "I believe issues programming should directly address personal monetary incentives and economic interests."

Suggested Project Areas

We agree that our multifaceted educational program should address not only the producer's interest in farm biosecurity as it relates to the issue of food safety, but also to the producer's financial well-being.

The following are suggested study areas for biosecurity:

- **Demonstration Projects –** These field trials would feature various classes of livestock and would demonstrate the most practical applications of biosecurity to improve food safety and reduce the production costs.
- **Cost/Benefit Studies –** There is currently a lack of information on the financial parameters of investing in biosecurity. Agriculture economists must develop projections as well as biosecurity and economic models that will have high credibility with corporate farm accountants, bankers, and other decisionmakers.
- **Farm Hygiene Research –** Extension must help to explore efficient ways to engineer greater sanitation and hygiene into the production and transportation of poultry and livestock. An example of this type of Extension-stimulated multidisciplinary approach is the cooperative research on salmonella decontamination by engineers, microbiologists, and veterinarians at the University of Maryland.
- **Partnerships With Government –** To develop innovative programs for improving biosecurity, Extension can serve as a catalyst for joint efforts

between individual farmers, farm organizations, local veterinarians, and government agencies. Structured programs can provide rewarding incentives. Memoranda of Understanding between producers, veterinarians, and staff of the Food Safety and Inspection Service, USDA, are helping to decrease drug residues and improve markets.

With Extension's strategic involvement, food animal producers can look forward to a new age of animal health and food safety. ▲

▲

Biosecurity minimizes the likelihood of animals being exposed to disease by using special management and housing systems. Fady Elassaad, engineering graduate student, University of Maryland, conducts an experiment in microbiology laboratory to improve the way poultry coops are decontaminated.

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Food Handling Is A Risky Business!

Barbara R. Fritz, Volunteer Extension Instructor; Nancy L. Cohen, State Extension Specialist, Nutrition and Foods, Assistant Professor; and David A. Evans, Extension Specialist, Professor, Applied Microbiology, Department of Food Science, University of Massachusetts

Scenario: On a Monday morning, a cook at a shelter for the homeless cooks a big pot of stew and allows it to simmer for several hours. When the stew is done he turns off the stove and lets it cool in the pot. He places the stew pot in the refrigerator before going home.

The next day, the cook reheats the stew and serves it. Those who partake of the stew immediately become violently ill.

What caused the illness? How could it have been avoided? What are the consequences? These are the kinds of questions asked of food handlers during food safety workshops developed by Extension at the University of Massachusetts and presented by Extension county agents throughout the state.

The risk of food-borne illness can be particularly serious where food is served to the elderly, the very young, or to people in congregate meal sites like family day-care centers or food services at homeless shelters. Among these populations at risk from undernutrition, food-borne illness can be a serious, even life-threatening condition. In most cases, proper food handling can prevent such food-borne illness. Yet, staff in food service operations often have limited knowledge of the hazards of food handling, and the practices and regulations needed to ensure a safe food supply.

Food Handling Workshops

Recognizing the need for food safety education programs, the Nutrition, Diet and Health Committee of Cooperative Extension at the University of Massachusetts targeted groups serving food to high-risk populations. The result is a program: "Food Handling Is A Risky Business" that combines traditional instruction about safe handling practices with information about regulations designed to protect the food supply as well as risks associated with various food handling practices.

Because reasons are given for the enforceable food handling regulations, workshop participants feel—for the first time—that they understand why certain practices are necessary. Many participants are surprised by the serious consequences that can result from what appear to be "minor infractions" of food preparation and handling regulations.

The 1-hour workshop activities include a lecture, a filmstrip, and a demonstration on potentially hazardous food. During the demonstration, egg or tuna salad that has been left unrefrigerated for more than 2 hours is passed among participants to show that food can look and smell fine and still be risky. Among the course materials for workshop instructors are a lesson plan, factsheets, and outreach and evaluation materials.

Positive Responses

On post-test questionnaires, 97 percent of participants rated the workshops "very informative and valuable."

"The number of questions asked by workshop participants indicates the high level of interest in the information provided," wrote a nutritionist in charge of meal sites for the elderly in Middlesex County. The filmstrip, discussion, and handouts, she pointed out, "contributed to the workshop's impact and value."

Many participants credit the workshop with alerting them to potentially dangerous food handling practices at home and in the workplace. Lois Carter, participant in a workshop for volunteers at a hospital coffee shop, stated that the workshop made her very much aware of bacteria. She now washes utensils between tasks and watches food temperatures much more carefully. She refrigerates leftovers promptly and cautions her family to do the same. She emphasizes she now is "aware of many food safety practices" she never would have thought of before the workshop.

As a result of attending the workshop, 72 percent of participants reported changing at least one practice; 91 percent reported an increased understanding of regulations pertinent to their jobs. During post-testing, 14 percent more respondents reported prompt refrigeration of leftovers, while the number who reported thawing food at room temperature decreased by 14 percent.

Through the multiplier effect, the targeting of food handlers allowed the program to reach many more high-risk individuals. One workshop, presented to 19 congregate meal-site managers, had the potential to impact over 900 elderly who patronized the sites. To date, 57 workshops have been presented to 830 food handlers. These food handlers have the potential to affect well over 30,000 individuals who are served meals by workshop participants. The post-test questionnaires revealed that 83 percent of respondents reported sharing workshop information with others.

Cooperative Extension ▲ University of Massachusetts

WANTED

SAFE FOOD HANDLERS

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So Our Food Crops Grow Safely

Susan O' Reilly, Managing Editor, *Impact Magazine*, University of Florida, Gainesville

Scientists at the Institute of Food and Agricultural Sciences, (IFAS) University of Florida, Gainesville, say that when it comes to the Nation's food supply, pesticides pose only a minute risk to the health of consumers.

IFAS experts say that the public has focused too intensely on the risks associated with pesticides, while neglecting to remember the benefits pesticides deliver. Although the public believes that pesticides pose very serious health risks, the facts are that pesticides are far down the list of agents that cause food-borne illness.

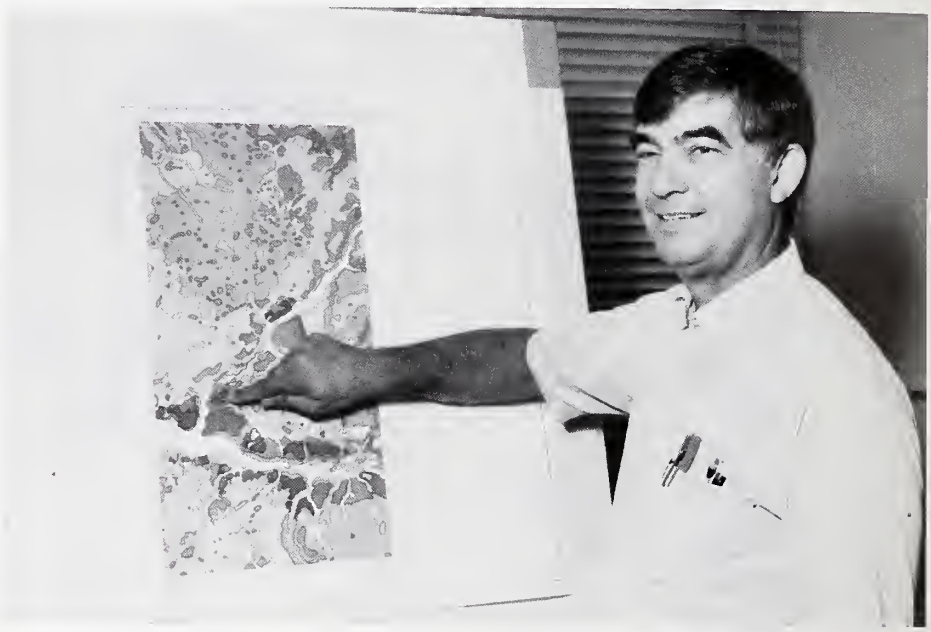
The National Research Council, affiliated with the National Academy of Sciences, reported recently that there is no evidence that pesticides or natural toxins in food contribute significantly to cancer risk in the United States.

Below Allowable Level

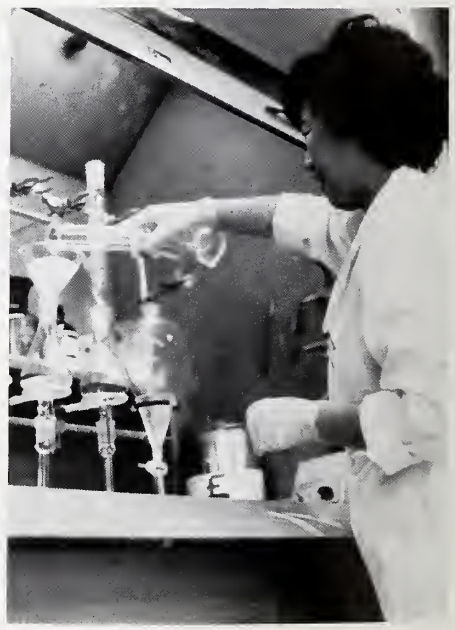
The levels of pesticide residue allowed in foods by the Environmental Protection Agency are far below what EPA considers harmful. In 1987, no pesticides were detected in 57 percent of 14,192 food samples tested by the Food and Drug Administration. Less than 1 percent of the food samples had residues exceeding the allowable EPA level.

In addition to killing plant pests, pesticides prevent the growth of pathogenic bacteria and other harmful organisms in fruits and vegetables. Some herbicides make conservation tillage possible, enabling [illegible] to spare the plow and protect the soil.

The use of chemicals has allowed farm output to increase greatly over the past 40 years, while manpower needs have dropped



▲ IFAS Soil Scientist Art Hornsby points to an "Environmental Guide" he devised that predicts possible pesticide ground water contamination.



▶ Chemist Jau Yoh, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, tests food samples for pesticide residues.

75 percent. Through their use, growers have gained more production from available lands, which keeps food prices low.

High Costs And Alternative Methods

However, scientists recognize there are reasons to reduce our dependence on chemicals: their high cost; the possibility of ground water contamination; and the loss of pesticide effectiveness as insect pests increase their resistance to them.

Extension and faculty at the University of Florida are assessing the impact of the potential loss of certain fungicides to find alternative methods of replacing serious gaps in Florida's arsenal of pest control measures. IFAS faculty continue to work to develop new crop varieties that are resistant to both disease and pests.

IFAS is pursuing a multifaceted approach to help protect the Nation's food suppy. IFAS Extension faculty publish and distribute extensive pesticide guides to teach growers how to use pesticides legally and safely.

Biological Control

At least 85 IFAS scientists are working on manipulating natural enemies or tailor-making viruses or fungi to attack and control insect pests. IFAS scientists have released a Brazilian red-eyed fly and a type of Uruguayan nematode to fight the damaging mole cricket, blamed for $46 million annual damage to pastures, golf courses, and commercial turf operations.

IFAS scientists are also developing a fungus that has already killed fire ants in field tests in Brazil. The University of Florida spends about $3.2 million annually on biological control research, two-thirds of which is provided by the state, with the remainder almost equally divided between federal funds and private grants.

"If we are to reduce our dependence on chemicals," says G. L. Zachariah, IFAS vice president for Agricultural Affairs, "we must pursue biological alternatives. These alternatives buy us the time we need to breed better pest resistance into crops and develop improved vaccines to protect the health of animals and ourselves."

Art Hornsby, Extension soil scientist, IFAS, has devised a method of gauging the possibility of pesticides threatening ground water supplies. The "Environmental Guide Sheets" he devised help consumers and commercial applicators choose pesticides with less potential to leach into ground water.

After analyzing soil and pesticide properties, rainfall patterns, and EPA health advisory levels, Hornsby has written guides for registered chemicals commonly used on corn, soybeans, small grains, cotton, and several vegetable and fruit crops. "For the first time, farmers or growers can select a pesticide based on its potential for leaching," says Hornsby. "At the present time—except for some pesticides with ground water warnings on their labels—they have little information."

Integrated Pest Management (IPM), another practice recommended by IFAS scientists, encourages growers to use crop rotation, and use a pesticide only when absolutely necessary. They credit IPM with cutting insecticide use in half.

Extracted from an article in *IMPACT*, a magazine of the Institute of Food and Agricultural Sciences, University of Florida, Gainesville.

◀

IFAS Entomologist Jerry Stimac is investigating a naturally occuring fungus that appears to reduce fire ant populations. Scientists are studying natural alternatives to pesticide use in biological control research.

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Great Lakes Fish: Safe To Eat?

Carol Y. Swinehart, Extension Communications Specialist,and Charles Pistis, District Extension Sea Grant Agent, Michigan Sea Grant Extension, Michigan State University

Are Great Lakes Fish safe to eat? There's no simple answer to the question. For now, each person must develop his or her own response to the situation, taking into account the following: information about contaminants in the Great Lakes; facts about the fish; and personal values and perspectives on risk.

Michigan Sea Grant Extension, in cooperation with the Michigan Agricultural Experiment Station, and Michigan State University's (MSU) Pesticide Research Center and Center for Experimental Toxicology, are developing information to help Michigan residents make their decisions.

The Great Lakes—Superior, Michigan, Huron, Erie, and Ontario—and their connecting channels, form the largest surface freshwater system on earth. Industrial, municipal, agricultural, and recreational activities within the basin, as well as distant sources that send contaminants through the atmosphere, add pollutants to the ecosystem. Pollution is more of a problem in major population centers on Great Lakes rivers, harbors, and connecting channels than in the open waters of the lakes.

Great Lakes sport fishing has become world renowned, and the charterboat has become common on the Great Lakes. Commercial fishing operations also harvest Great Lakes fish—especially whitefish, lake perch, and chubs—popular at restaurants and markets.

Toxic Substances In Fish

Ironically, and almost simultaneously with the state's recreational sport fishing over the past 25 years came discoveries of toxic substances in the Great Lakes. At least 400 synthetic organic chemical compounds have been identified in the Great Lakes ecosystem.

Many of these chemicals have been banned or severely restricted because they do not degrade quickly or easily in the environment, and because of their potential impact on the health of aquatic organisms.

Most species of Great Lakes fish do not have contaminant problems. However, certain organic chemical compounds accumulate in the fatty tissues of aquatic organisms, especially large predator fish, and do not readily leave the body. These organic compounds are fat soluble, and this characteristic makes them more likely to be taken in and stored (bioaccumulated) by aquatic organisms.

As each higher life form in the food chain preys on contaminated lower ones, the quantity of contaminants in its own system is multiplied. Fish absorb toxic compounds from lower organisms in their diet and, to a lesser extent, directly from the water through their gills. So, the concentration of a contaminant in fish is directly related to the amount of contamination in the aquatic ecosystem.

Although taxic levels in Great Lakes fish have declined dramatically over the 20 years after they were first discovered, some organic compounds are still found in certain species of Great Lakes fish and continue to cause concern.

Mason County Extension Director Bill Robb weighs one of the 81 Chinook salmon used in the PCB study, while Michigan Sea Grant Researcher Lisa Williams, Michigan State University, records data.

Contaminants And Human Health

The effects of contaminated fish on human health are hard to predict because they depend on the following factors, each af which is difficult to measure: the toxicity af the chemical; the total amount ingested; and the diet, health, lifestyle, age, and genetic makeup of the consumer.

Public officials analyze contaminants in samples of Great Lakes fish, study the health of people who eat fish, and issue advisories on consuming the sport fishing catch. The Great Lakes states try to coordinate their fish

analysis techniques and advisories. The advisories are designed to provide a large "margin of safety" and describe the locations, species, and size of fish where consumption precautions should be followed. Also, Michigan applies federal guidelines to Great Lakes fish caught commercially and sold in the state.

Research-Based Approach

Over the years, Cooperative Extension at MSU has worked with numerous organizations and individuals to help people understand the issues surrounding the safety of Great Lakes fish.

As early as 1980, Sea Grant Extension agents were using an Extension bulletin, *Understanding Contaminants In Fish*, to help educate people on this topic. Agents trained Extension home economists in fish preparation techniques. They conducted numerous fish cleaning demonstrations before sport and charter fishing groups to illustrate the skinning and trimming techniques known to reduce the fatty tissue in the edible portion of the fish and, thus, the concentration of contaminants. In 1987, Sea Grant Extension, with the cooperation and support of the Michigan departments of public health, natural resources, and agriculture, published an updated version, *Eating Great Lakes Fish*.

In 1985, Cooperative Extension and the Agricultural Experiment Station at MSU supported a marketing study of Michigan charter fishing clients. Extension agents and charter captains throughout the lower peninsula asked anglers to rate their concerns about charter fishing. Among the top issues was contaminants in the catch.

Responding to that concern, charter captains in the Ludington area asked Michigan Sea Grant Extension Agent Chuck Pistis to help them obtain more specific data about polychlorinated biphenyls (PCB's) in one of the most popular sport species—Chinook salmon. They were especially concerned with the amount in the fillet portion of the fish, the portion they usually gave their customers.

A team comprised of MSU researchers, Sea Grant, and other Extension agents, and 25

◀

Charterboat captain Gary Montie, Flint, MI, fillets a chinook salmon as part of a study on PCBs. He is one of 25 captains from the Ludington Charterboat Association cooperating with Extension Sea Grant agents and researchers from Michigan State University in an intensive sampling of the popular sports fish.

◀

During a summer festival in the Lake Michigan port of Grand Haven, Extension Sea Grant Agent Chuck Pistis demonstrates a food safety tip – trimming fatty tissue from salmon fillets. This trimming reduces consumer exposure to contaminants

captains from the Ludington Area Charterboat Association, took up the challenge. The group—supported by grants from MSU's Agricultural Experiment Station, Sea Grant, and the Borden Corporation—conducted the most intensive sampling ever performed on Chinook salmon from a local fishery in the Great Lakes.

Study Results

The results of the study showed the following:

1. The skinned, trimmed fillets contained an average of less than 1 part per million (ppm) of PCB's, considerably below the "trigger level" of 2 ppm used by federal and state authorities in developing fish consumption advisories.
2. The larger and heavier the Chinook salmon, the higher the concentration of PCB's.
3. When length and weight factors were considered, there was no significant difference among the PCB levels in fillets from Chinook caught during the various seasons.

From this sample, agents and charter captains can now predict the most likely range of PCB levels for a given Chinook fillet. The results also support other findings that the method of preparing the fish for cooking—that is the filleting, skinning, and trimming of as much fat as possible—reduces the concentration of contaminants.

"This certainly answered our questions as well as they can possibly be answered," says Mike Davis, president of the Ludington Area Charterboat Association.

The captains passed on cooking method findings to their customers. They know, based on prior studies, that deep frying in corn oil or baking, broiling, or barbecuing fish on a rack will reduce the levels of contaminants an additional 30 to 70 percent.

Definite Answers?

The answer to the question, "Are Great Lakes fish safe to eat?" involves both public policy and personal perspective and choices. However, in the future, as more sophisticated measuring and analysis techniques are developed, and long-term studies are completed, it may be possible to provide more definite answers for certain groups of consumers, and for certain species and sizes of fish from different locations. As long as questions remain, Extension will help answer them.

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Pesticides And Public Awareness

Patricia Kendall, Extension Specialist and Associate Professor, Department of Food Science and Human Nutrition, and James Loftis, Extension Specialist and Associate Professor, Department of Agricultural and Chemical Engineering, Colorado State University

Pesticides are widely used to produce blemish-free fruits and vegetables at low cost. Despite the fact that they are regulated by state and federal governments, consumers are concerned about the health effects of pesticide residues in food.

Consumers feel they have little control over their exposure to pesticides. This situation provides Cooperative Extension with an excellent opportunity to employ the research-based education necessary for consumers to make informed decisions.

Informed decisionmaking includes rationally assessing the potential for risk, determining "acceptable risk," and minimizing or managing that risk for the well-being of those affected.

Colorado was one of eight states to sign a "Safety in the Food Supply Pilot Project" cooperative agreement with ES-USDA. To promote the concept of "rational alertness" regarding pesticides in the food chain, the agreement required that we develop both a videotape and a bulletin aimed at consumers and small gardeners.

We sought to convey the following major concepts in our materials:

- Zero risk or absolute safety in the food area is attainable;
- The regulatory process for agricultural chemicals, using the "risk-benefit" concept, provides reasonably priced and high quality produce and a high level of safety for consumers;
- Producers, large and small, are still responsible for protecting the quality of food and the environment by proper selection of pest control measures; and
- Consumers, through a "rational alertness," can make informed choices that protect their health and thereby influence the marketplace.

To identify persons to interview and develop the technical outline of the video-audio script, we worked with faculty and Extension specialists in six departments, communications specialists, and representatives of other other agencies. The videotape production was the responsibility of the Colorado State University Office of Media and Public Relations.

We were careful to avoid invalid "cross-hazard comparisons" such as comparing the risks of pesticides in food to the risks of driving an automobile; this is a popular but often misused tool in risk communication.

Viewpoint

The interdisciplinary team agreed the videotape was to be regarded as successful if a majority of viewers rated the viewpoint as balanced and the remainder were equally divided between "overstating" and "understating" the risks.

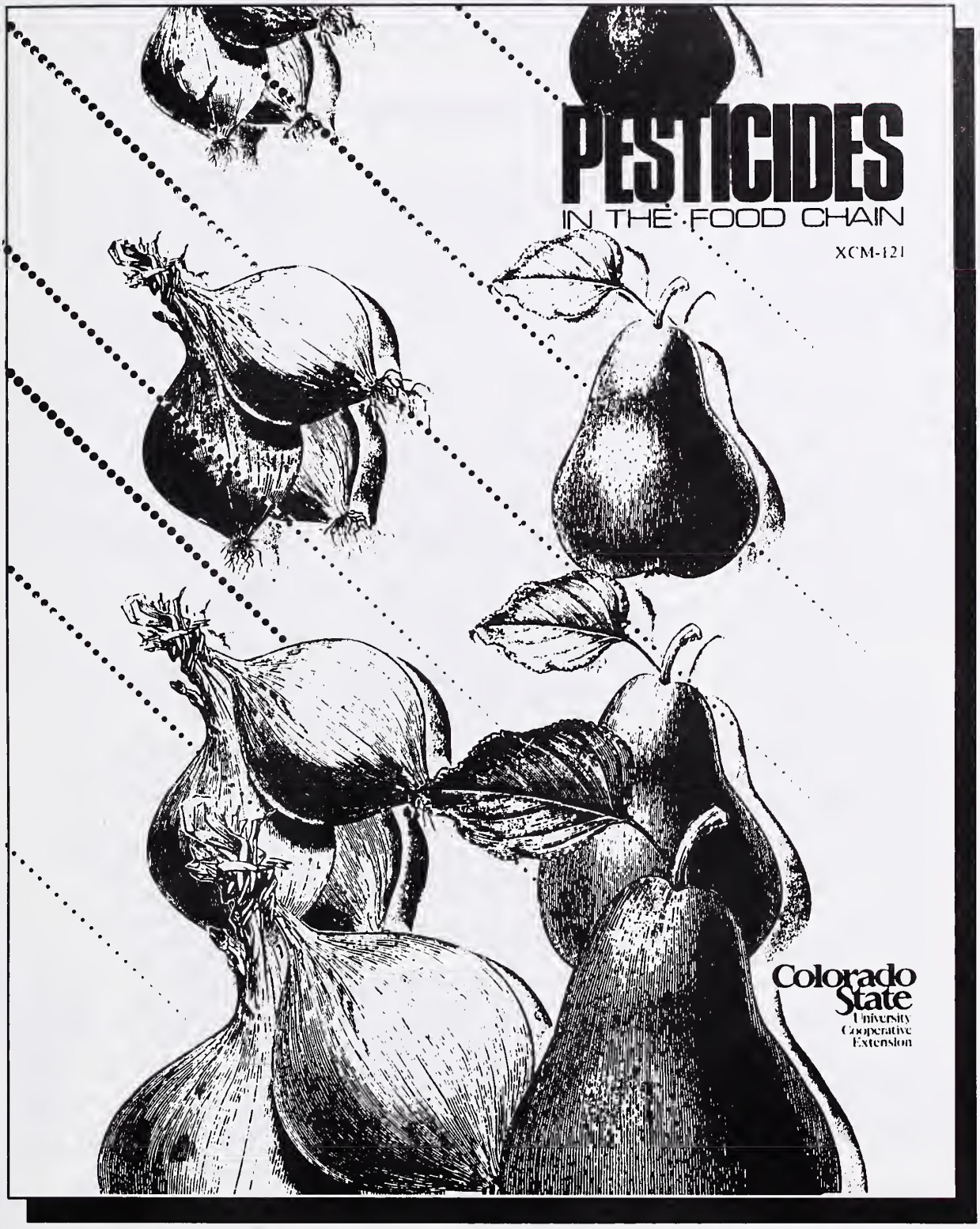
To test this point, we surveyed 146 videotape viewers. We discovered that 67.8 percent of the viewers felt it was balanced in its risk approach. Among those who did not consider its viewpoint balanced, a few more viewers thought the video "understated" the risks (21.9 percent) than "overstated" them (10.3 percent).

Respondents also indicated they understood the process of regulating pesticides better after viewing the videotape. Thus, we concluded that the videotape was successful as an educational tool.

High Interest Shown

Interest in the videotape has been high. To date, representatives of Extension locations in 28 states and in Canada have purchased it. A number of chemical companies and commodity groups also have shown interest in it. In addition, the *Journal of Nutrition Education* reviewed it favorably.

Consumers have responded favorably to the documentary method employed. Typical comments have included: "Very well done. Explains the problems and processes of pesticide risks quite clearly, and puts the responsibility for decisions with consumers," and "Professionally done . . . the opinions seemed much more balanced than many documentaries. You offered information to us, as consumers, and allowed us to reach our own conclusions. Well done."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FARAD—

The Food Animal Residue Avoidance Databank

Food safety has become one of the most visible and controversial issues of recent times. Consumer fears over the safety of animal-derived foods has led to eroding public confidence in the beef, pork, and dairy industries. Of greatest concern to consumers are residues of drugs, pesticides, and other chemicals in the food supply.

In a national survey conducted by the Food Marketing Institute, the number one concern of consumers pertained to residues in meat, while other health-related issues such as cholesterol and saturated fat content were perceived by the public as less threatening.

Livestock producers recognize that developing effective residue avoidance programs will require access to a vast array of information that was virtually inaccessible prior to the development of the FARAD program.

FARAD (Food Animal Residue Avoidance Databank) offers a means of providing this vital information. FARAD is a computer-based decision support system designed to provide livestock producers, Extension specialists, and veterinarians with practical information on those drugs, pesticides, and environmental contaminants that have the greatest potential for staying in animal tissues at the time of slaughter.

The overall goal in providing this information is to reduce the incidence of chemical residues in foods of animal origin. The FARAD program was developed by pharmacologists and toxicologists at the University of California-Davis, the University of Florida, and North Carolina State University. Funding for the program has been provided by the USDA through the Extension Service and the Food Safety and Inspection Service.

FARAD maintains current label information including withdrawal times on all drugs approved for use in food animals in the United States and on hundreds of products approved in Europe. Official tolerance values for drugs and pesticides in tissues, milk, and eggs are accessible through FARAD, as is physicochemical information on approximately 300 compounds.

Drug And Chemical Compilation

The majority of information contained in FARAD, however, pertains to the fate of drugs and chemicals in food animals.

This information is the most crucial to residue avoidance and mitigation, and has been compiled through exhaustive examination of more than 2,000 published literature articles.

The FARAD system is divided into two main areas; data compilation and analysis, and a decision support service. Data compilation and analysis are performed at the University of California, the University of Florida, and North Carolina State University.

Three Access Centers

FARAD is currently an "expert-mediated decision support system" in that an actual human expert is a critical element in service delivery. Three Regional Access Centers at the University of Florida, the University of California, and the University of Illinois service the entire country.

Typical questions concern appropriate drug treatment withdrawal times to prevent violative residues. The answer may be as easy as looking up the appropriate time in the FARAD Food Animal Drug Compendium, or it may entail a complex review of the scientific literature with sophisticated mathematical modeling. The effort involved varies considerably, but the goal is always the same: food safety.

Future Directions

Artificial intelligence software (expert systems) will be used to enhance the information delivery in FARAD to clientele. The high-powered computers of today will be used to analyze the enormous amounts of data in the kinetic database file, and discover factors that promote the excretion of chemicals. The FARAD decision support system will also be made more widely available to colleges of veterinary medicine, Extension specialists, and state and federal regulatory agencies.

FARAD is not a static database. It is an evolving decision support system that will continue to improve the delivery of residue avoidance information. By providing this service, FARAD will continue to aid producers, educators, and the consuming public by helping ensure the production of safe foods. Producers and veterinarians are strongly encouraged to use the services by calling one of the Regional Access Centers listed below:

East Coast States

University of Florida (904) 392-4085

Midwest States

University of Illinois (217) 333-3611

Western States

University of California (916) 752-7507

Coauthored by Arthur L. Craigmill, Extension Environmental Toxicologist, Department of Environmental Toxicology, University of California, Davis; Stephen F. Sundlof, Associate Professor, College of Veterinary Medicine, University of Florida; James E. Riviere, Veterinary Pharmacologist-Toxicologist, School of Veterinary Medicine, North Carolina State University.

Safe From Farm To Table

Ron Daines,Former Chair, Extension Information Group, Utah State University

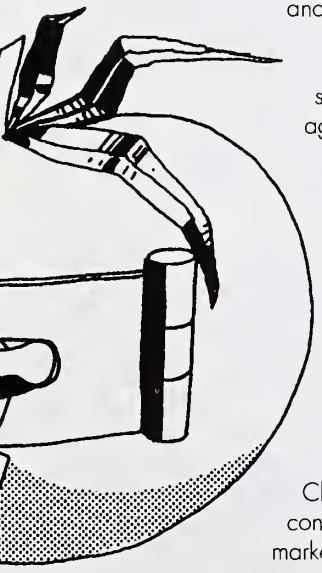
In March 1989, when Utah Extension's Nutrition, Diet, and Health Task force first met, national media was focusing on pesticides and food safety.

The task force members wasted no time. "Our charge was to respond to current issues," says Georgia Lauritzen, Utah State University Extension nutritionist, and chair of the Utah tosk force. "So we started plans right there to develop o forum that would address consumer concerns about food safety."

Is Utah's Food Safe?

After intense planning, a statewide conference was held in September 1989, to address the question, "Is Utah's Food Safe?" Nearly 100 people representing consumers, food retailers, hospitals, universities, the media, regulators, inspectors, and government agencies spent a full day exploring issues vital to safety in the food chain—from farm to the table.

Utah Governor Norman Bangerter opened the conference, expressing concern that the ban of Alar use on apples and the discovery of salmonella in poultry had seriously reduced agricultural production. He said we rarely have to worry about the fitness of our food, but we need to balance risks with economics to preserve a safe supply.



Christine M. Bruhn, consumer food marketing specialist, University of California-Davis, and an expert in food safety ond consumer food issues, presented the keynote address, "Is the U.S. Food Supply Safe?" She said that while pesticides ond chemicals prompt consumer concern, residues in food are well below established standards and that the greater priority in food safety is to deal with the microbes in both food and water that cause diseose.

Conference Agenda Highlights

The day's agenda continued with seminars communicating risks and benefits to the public; food safety legislation; functions of the USDA Foad Safety and Inspection Service (FSIS); the role of the media in food safety issues; and a review of the then current situation and outloak for meat, water, dairy, fruits, vegetables, and grains. The conference concluded with a panel on the challenges and issues of food safety, led by a local television broadcaster.

Key to the conference's success was support from several groups, including Farm Bureau, Utah Dietetic Associatian, retail grocers, Utah Home Economics Association, state school superintendents, Utah Division on Aging, Utah Food Stamp Office, USDA's FSIS, and the National Cattlemen's Association.

Mixed Response, But Positive

Most participants soid the conference accurately presented the facts, but a few said it was one-sided. Still, task force members felt the conference taak a long stride toward achieving its main goal af letting Utah residents know thot the American food system is as safe as, or safer than, any in the world.

"Certainly there are legitimate cancerns about food safety, but in general you couldn't ask for sofer food," said DeeVon Bailey, Utah Extension economist and a task force member. "We may have to realign aur education pracess to spread that message. But we're confident we have the people in Extension and in the food supply chain who can do that."

Request For Annual Meetings

Nearly all attending the Utah conference on food safety suggested an annual gathering to continue the dialogue. Among suggested topics: food safety in the hame, regulations in grocery stores and salad bars, food additives, food-borne illnesses, educational techniques, the international situatian, and alternate management options for pesticides and crops.

Food Safety And Natural Toxicants

On September 7-8, 1990, Utah Extensian ond the Utah Agricultural Experiment Station addressed food sofety ot their Second Annual Land Grant Days Conference. The first Annual Land Grant Days Conference, which focused on the faod safety theme, drew nearly 500 people, and generated widespread publicity during its premiere in September 1989.

This year's conference focused on natural toxicants found in most fruits and vegetables—an issue that has only recently begun to receive public attention. In addition to familiar nutrients, plants produce a variety of "secondary compounds" that help protect them against invasion by microbes or against being eaten by insects. These secondary compounds are not all bad; many compounds are used in carefully controlled ways as medicines—familiar examples are quinine and digitalis. But in sufficient amounts, they are poisons.

At the conference, various speakers addressed such subjects as hormone and antibiotic residues in food, chemical contamination, assessment of pesticide residues and food safety, and balancing dietary guidelines with food safety concerns.

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Residue Avoidance Program — A Cooperative Effort

George W. Meyerholz, Retired National Program Leader, Veterinary Science, Extension Service, USDA

American agriculture produces an abundance of high-quality, reasonably priced food. Increasingly sensitive analytical methods have revealed small amounts of unwanted chemicals in food with consumers expressing growing concern.

A 1989 Food Marketing Institute survey of consumers shows 82 percent feel pesticide residues constitute a serious health hazard. Antibiotics and hormones in poultry and livestock were regarded as hazardous by 61 percent of those surveyed.

In 1978, the Food Safety and Inspection Service (FSIS) requested assistance from Extension Service (ES) to educate producers in the use of sulfa in swine. Subsequent swine sulfa residue violations decreased from approximately 13 percent in 1977, to 4.8 percent in 1982. ES also contributed to the successful 1979 Swab Test on Premises program to reduce residues in meat.

FSIS and ES signed a cooperative agreement in 1982. The agreement provided for "joint design and collection of data necessary for developing a management program which will provide added insurance that animals and poultry coming to slaughter will not be considered adulterated under the Federal Meat Inspection Act or the Poultry Products Inspection Act." Special funding helped initiate the program from 1982-84 and the Residue Avoidance Program has continued into the 1990's.

ES federal staff, state specialists, county agents, and other resources of the Cooperative Extension System (CES) have responded with FSIS and other USDA agencies, the Food and Drug Administration (FDA), and the livestock and poultry industries, to the public concern for food safety.

Purpose Of Residue Avoidance Program

The cooperative RAP effort helps farmers and others involved in animal and poultry production reduce the potential for drug and chemical residues in their products. The emphasis is on residue avoidance or prevention through good management practices. Other recommendations:

- Examine livestock and poultry systems to determine critical control points for residue avoidance;
- Develop management recommendations to eliminate factors contributing to residue violations; and
- Educate producers and others in the livestock and poultry industries to avoid residues and improve the safety of the meat supply.

Some RAP Features

RAP efforts involve over 1,000 state Extension administrators, agricultural program leaders, and specialists in plant, animal, dairy, and poultry sciences, as well as veterinary medicine and other disciplines. County Extension agents also play a major role. Forty-nine projects were funded in 33 states.

More than 200 videotapes, slide/tape shows, posters, envelope stuffers, publications, and demonstrations were produced. A Food Animal Residue Avoidance Databank (FARAD) was developed as a source of information and knowledge for Extension personnel, producers, veterinarians, and others.

RAP is a program shored with other agencies, including the Agricultural Research Service, Cooperative State Research Service, Economic Research Service, and other state and federal agencies.

The Extension System has responded to the needs of regulatory agencies, and to the public concerns for food safety. Statistics compiled by FSIS show that since Extension became involved with RAP, residue violation rates have decreased 81 percent.

Reduced violations reduce costs, improve the image of the meat supply, and protect U.S. opportunities for marketing products in foreign countries.

Industry Involvement

Residue avoidance in food products depends on the cooperation and acceptance of the livestock and poultry industries. The RAP concept is a self-help program for producers—a systematic attack on the residue problem whose success will depend on acceptance by the meat-producing industry — and the input of industry into program direction. Farm organizations, meat-producing organizations, government agencies, and others are actively involved in coordinating industry support.

Voluntary Quality Assurance Programs

The livestock and poultry industries are developing voluntary quality assurance programs. Emphasis is presently on prevention of violative residues of pesticides, drugs, and other chemicals. In the future, additional food quality and safety factors may be included. Methods of RAP certification or verification are being developed to meet standards and guidelines. When these new requirements are completed, states will need

ta conduct educational programs to promote adaption of quality assurance pragrams.

The FDA and USDA are interested in voluntary quality assurance programs because they have the potential to serve as a valuntary compliance method for food safety and quality requirements. This could reduce the need for more intense gavernment inspections, thus saving millions of dollars for state and federal regulatory agencies.

Beef, dairy, veal, swine, poultry, and, passibly, other food animal industries have voluntarily initiated quality assurance programs. Management practices that produce healthy animals may reduce the need for drug use. And, when animal drugs are needed, careful and proper use will help provide wholesome, safe animal products to cansumers. ▲

A media campaign designed to urge farmers to use the correct amount of drugs to ensure against drug residues in swine. ▼

"Being Beautiful Doesn't Count if You're Condemned for Drug Residues!"

Why take a chance? Stay on the safe side. Follow feed tag and drug label instructions . . . ***especially withdrawal times.***

Bureau of Veterinary Medicine • Food and Drug Administration

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Dial InfoSource For Food Safety

Amelia Wuellner, Extension Electronic Publishing Coordinator, University of Wisconsin-Madison

For consumers in southeastern Wisconsin, answers to questions about cooking trout from Lake Michigan safely or knowing the correct cooking times to preserve vegetables are as easy as dialing a phone.

The University of Wisconsin-Extension's (UWEX) InfoSource, a computer-based audiotex service, answers client questions with prerecorded messages on a variety of food safety topics and issues. In addition to the food messages, there are messages on topics such as child care, parenting, and finances. InfoSource can also answer a variety of horticulture questions.

InfoSource is available in the metropolitan Milwaukee and Kenosha-Racine areas with a population base of 1.5 million. Anyone with a question on food safety can call into InfoSource with a Touch-Tone phone and select a message with the numbered keypad on their phone. The tones from the phone prompt a computer in the county Extension office to "play" the chosen message.

"The concept of InfoSource is important," says Mary Mennes, Extension food management specialist at the University of Wisconsin-Madison. "Technology and Extension information are linked to offer answers to the basic repetitive questions and to fulfill the need to get current information quickly to lots of people."

Expanding The Hours

InfoSource allows agents to devote more time to other programs. It extends UWEX resources. Because it can answer questions 24 hours a day, 7 days a week, InfoSource expands the hours that UWEX can successfully reach clients and answer their questions.

▲ An Extension client consults the InfoSource-audiotex service at University of Wisconsin-Extension (UWEX). A prerecorded message will answer questions 24 hours a day, 7 days a week. This frees Extension agents and expands the hours that UWEX can react to emergencies.

▶ Typical computer used in Wisconsin Extension county sites to store text and voice files for the InfoSource service.

"If you have a client canning tomatoes at 10 p.m.," says Tedi Winnett, Kenosha County UWEX home economist, "that client wants an answer to his or her question right away—not when we're in the office."

The System

InfoSource, now in its third season, offers 300 messages in the system. To handle the many text and voice files, each remote Extension site has an AT class microcomputer running at 12 MHz with a 300 megabyte ESDI hard drive.

A Dialogic D40 voice board controls the voice files, converting analog signals to digital information when a technician loads the taped audio scripts. When a caller requests a message, the D40 voice board then changes the digital signals back to audio (analog) signals. The D40 board also controls all multitasking functions.

UWEX is exploring a move to a voice recognition system that would allow "rotary phone callers" to use InfoSource fully.

Callers are offered instructions to guide them through a menu selection system. A "Touch-Tone caller" can choose to listen to a message and request an InfoSource brochure or a UW-Extension Publications Catalog. "Rotary callers" can listen to a daily tip and leave their name to receive the materials.

InfoSource Benefits

"InfoSource is a good introduction to UW-Extension as a reliable information provider," says Mennes, "and we use it as a followup tool by recommending brochures at the end of a message."

A 1988 survey of 196 callers showed that 57 percent were not previously aware that UWEX offered inexpensive bulletins. And 52 percent of the respondents had not heard of or used UWEX services before.

Mennes points out that the "tip of the week (or day)" option is a valuable tool to inform people about various food safety issues.

An added benefit for agents is the time they save. "I don't have to stay on the phone all day answering food safety or preservation questions," says Tedi Winnett. "Instead, I can devote more time to other projects."

Agents and specialists such as Mennes and Winnett voice the scripts and thus personalize the service. Also, the service allows callers to remain anonymous. "People may not want to admit to not understanding the message immediately," Mennes says. "InfoSource allows the caller to listen to the message more than once, thus ensuring comprehension."

Promoting The System

Monthly usage figures continually point out that promoting the system is vital. UWEX relies heavily on the local agents to promote InfoSource. "Through our columns, we can reach a lot of people," says Winnett. "including those who may not have heard of InfoSource before."

Agents distribute brochures through Extension workshops, Master Food Preserver, and Master Gardener training sessions. They also set up displays at libraries and similar public institutions. Agents promote the service through weekly newspaper columns and radio call-in shows.

By keeping InfoSource in the public eye, people learn to use the service to answer their food safety, family living, and horticulture questions. This constant exposure leads to word-of-mouth promotion.

A Viable Solution

InfoSource has a ripple effect in making more people aware of UWEX. Most of those who use the system will use it again (97 percent) and most of these people will share the information they receive from InfoSource, a survey has disclosed.

For UWEX, InfoSource has proven to be a viable solution to an increasing demand for answers to food safety and other questions. This computer-based information service can provide people with information—when they want it and as many times as they wish to hear it.

"We in Extension are basically information brokers," concludes Winnett. "To remain competitive, we need to adopt these new technologies. With InfoSource, we can get a tremendous amount of unbiased, research-based information to more people when they need it!"

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Developing Communication Strategies

William Schafer, Extension Food Technologist and Assistant Professor, Department of Food Science and Nutrition, and Linda S. Dieleman, Extension Project Leader, Food Production, Nutrition and Health, University of Minnesota

Besieged by news reports about BST (bovine growth hormone) in milk, salmonella in eggs and poultry, and the proposed irradiation of various foods, Minnesota consumers are understandably concerned about the safety of the food supply.

The general public is confused about toxicity studies, risk assessment procedures, and the regulatory process. Typical risk communication does not include such factors as control, fairness, and trust—factors that may determine acceptance. Often, the result is a less-than-balanced perspective on the issues without "risk-benefit considerations."

Minnesota Extension has initiated a collaborative approach to managing risk effectively. To share the various perspectives and generate ideas, we planned a forum and invited representatives from a variety of academic disciplines, restaurant associations, commodity groups, health organizations, and government agencies.

The 1-day forum on food safety—"Developing Communication Strategies"—was the fourth in a series of Food, Agriculture, and Nutrition (FAN) Forums. It was sponsored by the Intercollegiate Nutrition Consortium (INC) with funding from the W.K. Kellogg Foundation. The Consortium is a collaborative effort of the Minnesota Extension Service, College of Agriculture, College of Home Economics, the Medical School, and School of Public Health.

Brainstorming

One year before the forum, a 20-person brainstorming group, representing various disciplines within the university, and members of state agencies, formed and investigated a variety of food safety issues. They concluded that scientists and educators need to develop methods for responding to or anticipating food safety concerns.

The brainstormers' group suggested two major areas for exploration:

1. Strategies that foster effective education and response to food safety concerns; and
2. Nontechnical variables scientists and educators must take into account when developing their educational response.

To prime the audience before the forum, we mailed participants a notebook containing articles on risk assessment, risk communication, and information on regulatory/monitoring agencies.

Forum

Joseph Rodricks, Environ Corporation, Washington, DC, opened the forum with an overview of risk assessment.

A 2-hour workshop, "Perception of Risk: Hazard Versus Outrage," illustrated the effect of nontechnical variables on the public's degree of outrage on a food safety issue. Outrage, pointed out lecturer Peter Sandman, director, Environmental Communication Research Program, Rutgers University, involves people's fears and concerns about a risk rather than the scientific data that describe it.

Participants at additional work group sessions first identified barriers or weaknesses of existing networks and then generated ideas for a new structure, method, or network.

Food Safety Strategies

Two weeks after the forum, group facilitators conducted a debriefing meeting. Forum participants received reports of outcomes from each work group's facilitator, plus a compiled summary of all the group reports.

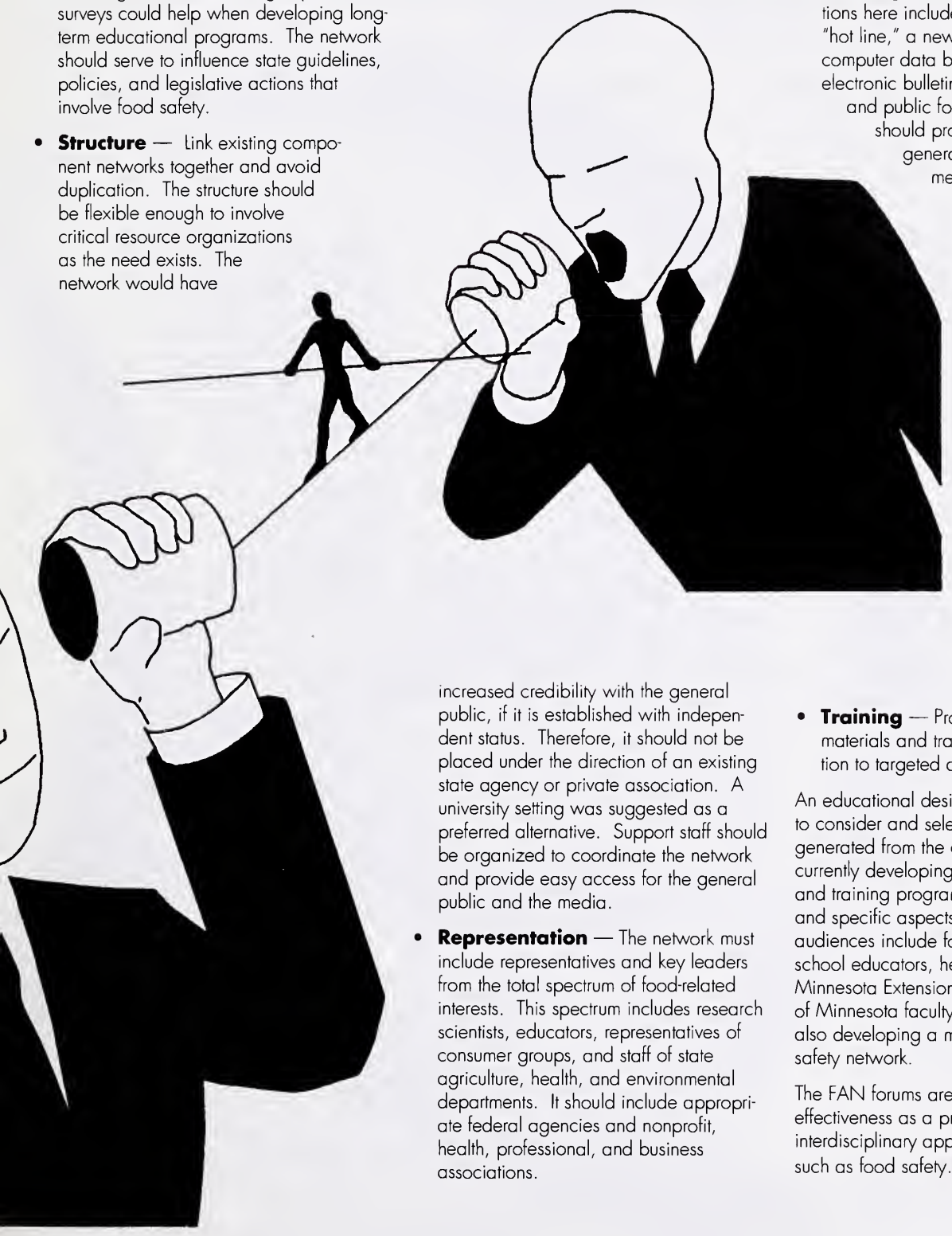
Participants reviewed and returned them with additions and corrections. This resulted in the following considerations for organizations when formulating major strategies for a food safety network—

- **Purpose** — The network should provide balanced information on risk that addresses both hazard (technical risk assessment) and outrage factors.

Priorities identified through environmental

scanning, consumer focus groups, and surveys could help when developing long-term educational programs. The network should serve to influence state guidelines, policies, and legislative actions that involve food safety.

- **Structure** — Link existing component networks together and avoid duplication. The structure should be flexible enough to involve critical resource organizations as the need exists. The network would have increased credibility with the general public, if it is established with independent status. Therefore, it should not be placed under the direction of an existing state agency or private association. A university setting was suggested as a preferred alternative. Support staff should be organized to coordinate the network and provide easy access for the general public and the media.



- **Representation** — The network must include representatives and key leaders from the total spectrum of food-related interests. This spectrum includes research scientists, educators, representatives of consumer groups, and staff of state agriculture, health, and environmental departments. It should include appropriate federal agencies and nonprofit, health, professional, and business associations.

- **Delivery Mechanisms** — Suggestions here included an "800" number or "hot line," a newsletter, fax machines, computer data base with remote access, electronic bulletin board, press releases, and public forums. These mechanisms should provide accessibility to the general public and mass media. Consider special means of reaching vulnerable population groups such as the elderly, poor, and parents of infants.

- **Challenges** — Potential issues to address for effective network operation include "turf battles" among professionals. There may also be reluctance or lack of skills by professionals when communicating to the media and the general public when that audience segment has differing values and socioeconomic levels.

- **Training** — Provide educational materials and training in risk communication to targeted audiences.

An educational design team was appointed to consider and selectively implement ideas generated from the conference. This team is currently developing educational materials and training programs on risk communication and specific aspects of food safety. Target audiences include food professionals, high school educators, health professionals, Minnesota Extension agents, and University of Minnesota faculty. This design team is also developing a model for a state food safety network.

The FAN forums are demonstrating their effectiveness as a process for developing interdisciplinary approaches to critical issues such as food safety.

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Reducing Food Fears

William Benjy Mikel, Extension Food Scientist, Auburn University

America's food supply is the safest in the world, but if you have read a recent newspaper or magazine article on the subject you might not agree. Chemical issues—alar in apples, dioxin in milk cartons, aflatoxins in grains, cyanide in grapes, and BST (bovine growth hormone)—are issues of consumer concern. However, food-borne illnesses from bacteria and other microorganisms—the real danger to our food supply—total an estimated 33 million cases annually, with direct and indirect costs estimated to be as high as $7.7 billion.

To reduce this threat as much as possible, we established two main program objectives of utmost importance. First, the general public needs assurance that although the American food supply is not 100 percent safe, it is the safest possible. As new technology prevails, foods will become even safer.

Secondly, our goal was to help consumers realize that the real hazard to our food supply is microbial contamination. Safe food handling and preparation procedures must be conveyed to those responsible for preparing food.

To address both issues, we developed programs designed not only to rebuild the confidence of consumers in the safety of our food supply, but also to educate them in proper food handling practices.

Target Audiences, Delivery Methods

Our problem was information transfer to our diverse Extension audience. Consumers make up our largest audience, but with an increasing number of family meals consumed outside the home each year, we also needed to reach food service workers, retailers, food processors, and wholesalers.

To accomplish our goals, we needed to reach food handlers in schools, day-care centers, prisons, and hospitals. Also, we were aware that the most powerful group we could address is the food editors of newspapers from around the state. Their high visibility and wide audiences make their support essential.

E-Mail And PSA's

We used electronic mail (E-mail) to disseminate timely information from the national level down the chain to the state and county agent levels. This speedy information transfer permitted agents to be on top of current food safety topics when consumers wanted information.

Public service announcements (PSA's), even during the prime times at 6 and 10 p.m. were spotted on both TV and radio to address the safety of our food supply and proper handling practices. Food safety specialists and county agents published numerous newspaper and magazine articles on food safety. We conducted county workshops with various groups to distribute information.

In addition to county-level consumer meetings throughout the state, special interest groups cooperated with Extension by holding numerous statewide meetings. For example, the state cattlemen's association cosponsored a program aimed at food retailers, distributors, and food editors. WIFE (Women Involved in Farm Economics) sponsored a statewide meeting concerning the safety of the food supply.

Seminars

Extension county agents conducted a seminar series dealing with food handling practices for day-care workers. These seminars, points out Linda Luman, principal lecturer, were coordinated through the state Departments of Education and Child Nutrition.

Extension County Agent Shirley Whitten designed a food-borne illness display for exhibiting at a meeting of the Southern Women's Show attended by 16,000 people. "Food safety is such an

important issue to today's consumers we must face it head on," she says.

Holiday Food Preparation

Extension County Agents Lisa Murphy, Karen Thompson, and Jean West conducted well-attended multicounty holiday programs on safe food preparation. The programs drew large crowds concerned with safe food preparation during the holidays. "During the holiday season, people often feed more people with a greater possibility of mishap," says Jean West, coordinator in Winston County.

Auburn specialists presented information on food safety and sanitation to a group of food science faculty and students from Guatemala who were on campus to study food processing.

Linkages

When it came to effective information outreach, Extension at Auburn discovered the "multiplier effect" of groups like food editors and retailers. But the cooperation of various groups, both government and special interest, was the working backbone of this endeavor. The county agents who deal with the public daily made a program of this magnitude possible.

Although each program was tailored for each specific group, a basic message was delivered in each meeting. First, our food supply is safe, and second, that we must all work to ensure its continued safety.

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Food Safety Training Pays Off!

Jo Anne Barton, Extension Specialist, Foods and Nutrition, and William E. Barbeau, Assistant Professor, Department of Human Nutrition and Foods, Virginia Tech

Despite the consensus among experts that our Nation's food supply is one of the safest in the world, public concern about this topic appears to be growing.

Although microbiological contamination is a more likely problem, consumers fear chemicals: pesticides, drugs, additives, and toxins. To avoid these chemicals, experts believe that consumers may feel threatened and limit their consumption of nutritious foods. And when consumers change food consumption patterns, food producers, processors, distributors, and handlers are all affected.

Extension agriculturists can influence the safety of the food supply as they work with producers on cultural and marketing practices. This influence can extend to applying pesticides, using growth promoters in feed rations, and caring for eggs, milk, and other commodities held for sale.

Food Safety Training

In 1988, Virginia Cooperative Extension implemented a pilot project funded by an ES-USDA grant, to provide food safety training for Extension agents. The primary objective of the project was to educate agents so they could help consumers understand and deal with food safety concerns.

First, Extension nutrition specialists employed a questionnaire to evaluate the current food safety knowledge of Extension agents in both home economics and agriculture. Ninety-six of a random sample of 106 agents returned the mailed questionnaire.

Results demonstrated that agents needed additional information about food safety.

When agents were asked to rate their knowledge of the subject on a scale of 1 to 5 (with 5 being the most knowledgeable), the average score was 3. Average score on the 15 "knowledge" questions was 60 percent, with only 9 agents scoring at or above the 80 percent level.

The questionnaire revealed that agents shared many of the same food safety concerns as consumers: use of artificial flavors and nitrates and other additives; effect of pesticides; and the need for more legislation. Agents were also asked to assess the risk of eating certain foods. For the most part, they were able to discriminate between "risky" and "minimal/no risk" situations. However, they did not always agree on the exact level of risk.

Members of an interdisciplinary team from the Colleges of Human Resources and Agriculture and Life Sciences at Virginia Tech taught a 2-day workshop on food safety to Extension agents in two districts.

During the workshop, participants were given a *Food Safety Manual* to use as a desk reference. Instructors offered presentations on food microbiology, pesticides, intentional and unintentional food additives, growth promoters and other drugs used in livestock production, risk assessment and communication, and consumer studies on safety of the food supply.

At the end of the workshop, agents identified the following potential audiences for food safety information: homemakers, 4-H members, members of community organizations that prepare group meals, restaurant workers, and food handlers in nursing homes, day-care centers, and schools. Agents in one planning district requested additional training to obtain certification to teach a food safety course for restaurant managers.

Six months after the workshop, a followup questionnaire to participants indicated they had increased their knowledge of the subject and were using the *Food Safety Manual* in response to consumer questions.

Workshop participants had an average score of 73 percent on 15 knowledge questions, 18 percentage points higher than nonparticipants. Eight out of 13 participants who completed the questionnaire answered 80 percent or more of the questions correctly.

Only 1 of the 16 non-participants scored 80 percent or higher.

The ability of participants to answer consumer questions was also assessed by telephone interviews. All agents gave appropriate responses with some indicating they were making use of the *Food Safety Manual* in answering the questions.

Extension agents recognize the need for additional training in food safety and are willing to attend workshop sessions. We have concluded that an interdisciplinary team of specialists is an effective way to address the many facets of food safety.

The Food Safety Message And Risk Perception

Deane Anderson, Applied Sciences Editor, Agricultural Press Service, College of Agriculture and Life Sciences, University of Wisconsin-Madison

American consumers are confused. Though many consider the United States to have the safest food supply in the world, consumers often receive conflicting information from the media about the food they eat.

Mixed Signals

One reason for the mixed signals is that consumers and scientists have different perceptions of the most important food safety concerns. Scientists rank food-borne illnesses from bacteria or other micro-organisms as the most serious food safety risk. But surveys show the public to be more concerned about pesticide residues and food additives, which most scientists rank low in importance.

Why are consumers often most concerned about pesticide residues and less concerned about bacterial contamination? It's all a matter of risk perception, says UW-Extension Food Management Specialist Mary Mennes.

Consumer Concerns

People are most concerned about risk when they feel they have no control over a situation, says Mennes. She notes that a lot of food contamination occurs in the home, despite efforts to educate consumers about safe handling practices. Many feel the risk of getting sick in their home is low because they are in control. On the other hand, Mennes says, people feel they have little control over what pesticides are used on the foods they buy.

One solution for educators is to find out what information people want about potential risks and provide them with facts that give them more control over their situation, according to Peter Sandman, a professor at Rutgers and a risk communications consultant.

Training

With this in mind, several county Extension offices in Wisconsin conducted classes on communicating risk information about food. In Kenosha County, Extension Home Economist Tedi Winnett and Horticultural Agent Mike Schneider led a homemaker leader training class on the issue of pesticides from the consumer perspective.

The purpose of the classes, says Winnett, was to explain what pesticides are, assess their relative benefits and risks, and discuss what consumers can do to minimize risk. The leader-participants in the class are then equipped ta relay what they have learned to their groups.

In the class, the Kenosha County agents explain how pesticide residues are measured in parts per million or even parts per billion, and put these numbers in realistic terms to which homemakers could relate.

Voluntary Risks

Buffalo and Pepin County Extension Home Economist Diane Brion, who also leads a training class on pesticides and food safety, says people are more willing to engage in an activity if it's voluntary, even if the activity poses a risk. She told her audience that health risks of eating food are small compared to smoking cigarettes, riding in a car, or living in a city.

Minimizing The Risks

The Extension training classes also emphasized steps consumers can take to minimize food safety risks. For example, proper washing, peeling, and cooking can rid food of pesticide residues and micro-organisms such as bacteria. Consumers can also ask the local grocery store manager to list where produce was grown and to request better food labeling. The county agents also explained what the federal government is doing to ensure a safe food supply.

Communicating risk to the public is difficult and pases a challenge to keep from slanting the information one way or the other, Tedi Winnett notes. She adds that consumers are confused because they receive mixed messages from the media. "Our job is to give people a better perspective on how to interpret these messages," shè says.

Several other Extension classes have been or will be held on communicating risk information. All classes include a video from Colorado State University entitled, "The Risks af Pesticides in the Food Chain."

Training Session Ideas

Here are several suggestions Mary Mennes has for caunty agents who plan to hold training sessions on risk communication and food safety.

- Spend time getting background information to prepare yaurself for teaching.
- Plan and teach the classes as an agent team, if possible. Agriculture and home ecanomics agents can complement each other's expertise in this complex area.
- Be prepared to deal with a wide range of questions, especially about chemicals or microbes receiving media attention. Don't dismiss them as "unimportant." Do your best ta find answers, but don't be afraid to say, "I don't know." Reading newspapers and magazines is as important in preparing for teaching as reading technical journals.

Agromedicine—

Getting Doctors Involved In Food Safety

Jere Brittain, IPM, and Agromedicine Coordinator; Libby Hoyle, Extension Food and Nutrition Specialist, Clemson University; and Sam Caldwell, Agromedicine Program Administrator, Medical University of South Carolina

National issues frequently generate "buzzwords." Buzzwords are not all bad—they may be concise expressions of new approaches to complex problems.

A word that has recently joined the buzzword list relating to the food safety issue is "linkages."

"Linkages" suggests the need for educators in agricultural production to work more closely with colleagues in home economics, food science, and even behavioral and social sciences.

The "linkages" image leads naturally to the question of whether important links are missing from a program or process. One such question is: Are medical doctors a missing link in Extension food safety educational programs?

Pivotal Role Of M.D.'s

"Medical doctors play a pivotal role in determining consumer ability to separate fact from fiction in media reports on agrichemicals and health," says Dr. Stanley H. Schuman, M.D., professor of epidemiology at the Medical University of South Carolina at Charleston (MUSC). Since 1984, he has been medical director of the Clemson University-MUSC Agromedicine Program.

Agrichemical And Health Education

"Unfortunately," Schuman points aut, "training for doctors typically does not include pharmacology and toxicology of widely used agrichemicals. However, once doctors learn about agrichemicals, they are extremely effective helping patients sort out concerns about health risks."

The Agromedicine Pragram pravides services on agrichemicals and health for medical, agricultural, and consumer audiences throughout South Carolina. Agromedicine Program activities include:

- Providing medical response to media and consumer inquiries concerning pesticides and health;
- Consulting with physicians about pesticide and health concerns of patients;
- Conducting seminars on such topics as pesticides and cancer for medical, agricultural, and consumer audiences; and
- Training Extension agents to communicate more effectively about the complex and controversial subject of pesticides and food.

Schuman, and many other scientists in the United States, do not think consumer fears about pesticide residues in food are supported by scientific fact. They point to the steadily increasing life expectancy in industrial countries, and the decline in neural tube birth defects. They also note the remarkable ability of the human body to detoxify or eliminate law levels of natural, as well as man-made, toxins.

Need For Advisory Physicians

Schuman believes a key to success and durability of the agromedicine model is to identify and train agromedicine advisory physicians at the county or community level. "In every county," he says, "we need at least one physician who is well acquainted with the county Extension staff and well informed on agricultural issues." To date, agromedicine advisory physicians have been identified and recognized in 35 South Carolina counties.

As a result of a W. K. Kellogg Foundation grant, the South Carolina Agromedicine Program has expanded to include faculty and students from Winthrop College, South Carolina State College and the Colleges of Nursing and Liberal Arts at Clemson University.

Michael R. Emlet, M.D., Prosperity, SC, (center) displays certificate naming him a consulting physician in the Agromedicine Program. Flanking him are Stanley H. Schuman (right), M.D., Medical Director of the Clemson University-MUSC Agromedicine Program and Morris Warner, County Extension Director, Newberry County, SC.

Medical and agricultural leaders from Georgia, North Carolina, and Virginia have joined South Carolina in an informal consortium to explore opportunities for agromedicine programs in these and other states.

South Carolina's leaders in agriculture and medicine believe that agromedicine is an effective answer to critics who claim the agricultural establishment is more concerned about higher yields and profits than the health of consumers and stewardship of the enviranment.

The cooperative Agromedicine Program has placed human health in a priority position on the agricultural agenda.

Teaming Up With Public Health Professionals

John Rushing, Extension Food Science Specialist, North Carolina State University

In North Carolina, Extension is continuing a longtime working relationship with the public health sector. This cooperative partnership benefits the food processing and food service industries, as well as the consumer. And, it strengthens the food safety programming efforts of Extension.

There are over 600 environmental health specialists in North Carolina, most of whom deal with food inspection. Their experience and education vary widely. Environmental health specialists are essentially county food regulatory personnel. They are often called upon to grade or inspect food and lodging as well as septic tank sites, swimming pools, and other sites.

In North Carolina, environmental health specialists are certified after a period of on-the-job training and evaluation by regional specialists. After a specified trial period and completion of correspondence and required short courses, the specialist may go before the Board of Sanitarian Examiners to obtain registry.

Extension cooperates with public health officials to provide training prior to registry, and to provide continuing education in order to maintain registry. Extension also serves as a scientific resource base on technical aspects of regulatory concerns.

Initial Training

For 20 years, the annual Food Protection Short Course has been a major provider of initial food safety training in North Carolina. This short course is an intensive survey of food safety topics of concern to the environmental health specialists with food inspection duties. Extension sponsors the training of North Carolina Environmental Health Services personnel. Resources are pulled together from across the state: faculty from NC State, public health personnel, and instructors from other universities and state agencies team up to make this the best course of its kind.

The short course begins with information about basic food microbiology, food-borne illness protection, and food processing. Training continues with the more applied aspects of the job. To date, over 1,500 environmental health specialists from North Carolina and 5 other states have taken the short course.

Extension contributes to the continuing education efforts for environmental health specialists through an organization known as the State of Practice Committee. The State Health Director appoints members of the committee to 3-year terms. Extension staff provide leadership and expertise in such areas as preventing food-borne diseases, epidemiological investigation of food-borne illnesses, surveillance of hepatitis A, and food microbiology.

Teamwork Pays Off

The benefits of a close working relationship between Extension and public health personnel are obvious. Often, the clientele of the two organizations overlap. Because of excellent communication, Extension is able to help new and established businesses with decisions related to regulatory matters. Public health personnel regularly team up with Extension to present short courses and workshops.

Regulatory agents are often participants in Extension-sponsored meetings to provide legal interpretations and technical expertise.

In North Carolina, trained environmental health specialists in each county multiply Extension efforts in food safety with nontraditional clientele. This cooperative venture benefits the goals of both Extension and public health regulators.

At the processing center where food safety training is conducted, John Rushing, Extension Food Science Specialist, North Carolina State University, (left), discusses technical details of a cook-chill system with specialists of the North Carolina Division of Environmental Health.

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An End To Almond Allergies?

Lori Hallowell, Assistant Research Writer, Department of Agricultural Communications, University of Nebraska-Lincoln

There's a common link among people who are allergic to almonds. Researchers at the University of Nebraska-Lincoln (UNL) are hoping this link provides clues to find a process for eliminating almond allergies.

"If the substances in almonds that induce allergy can be eliminated through food processing," says Tracy Bargman, UNL research assistant in food science, who has conducted one of the first studies on this subject, "even almond-allergenic individuals could eat almonds without suffering adverse effects." Bargman's research is conducted in cooperation with the Institute of Agriculture and the Natural Resources Agricultural Research Division at the university.

After researching eight adults with histories of almond sensitivity, Bargman found that each reacted differently to proteins. And she found one almond protein that all her subjects reacted to. This protein, she believes, may be the common link that could lead a possible processing method to reduce allergenicity.

"We're just getting off the starting blocks concerning foods that cause allergies," she says. "Our goal is to provide people with a safe way to consume almonds. It may be possible that only certain parts of the almond will be used."

Food allergies, it has been estimated, afflict 1 to 2 percent of the U.S. population, although precise numbers are hard to verify. Food allergies are defined as "abnormal immunological reactions to a food or a food component." The component normally is a protein.

Allergic Reactions

Each person's body, Bargman points out, responds differently to an allergen. Allergic reactions range from hives to shock, and, in some cases, death. The most common food allergies among U.S. adults, she says, come from peanuts, soybeans, fish, and nuts.

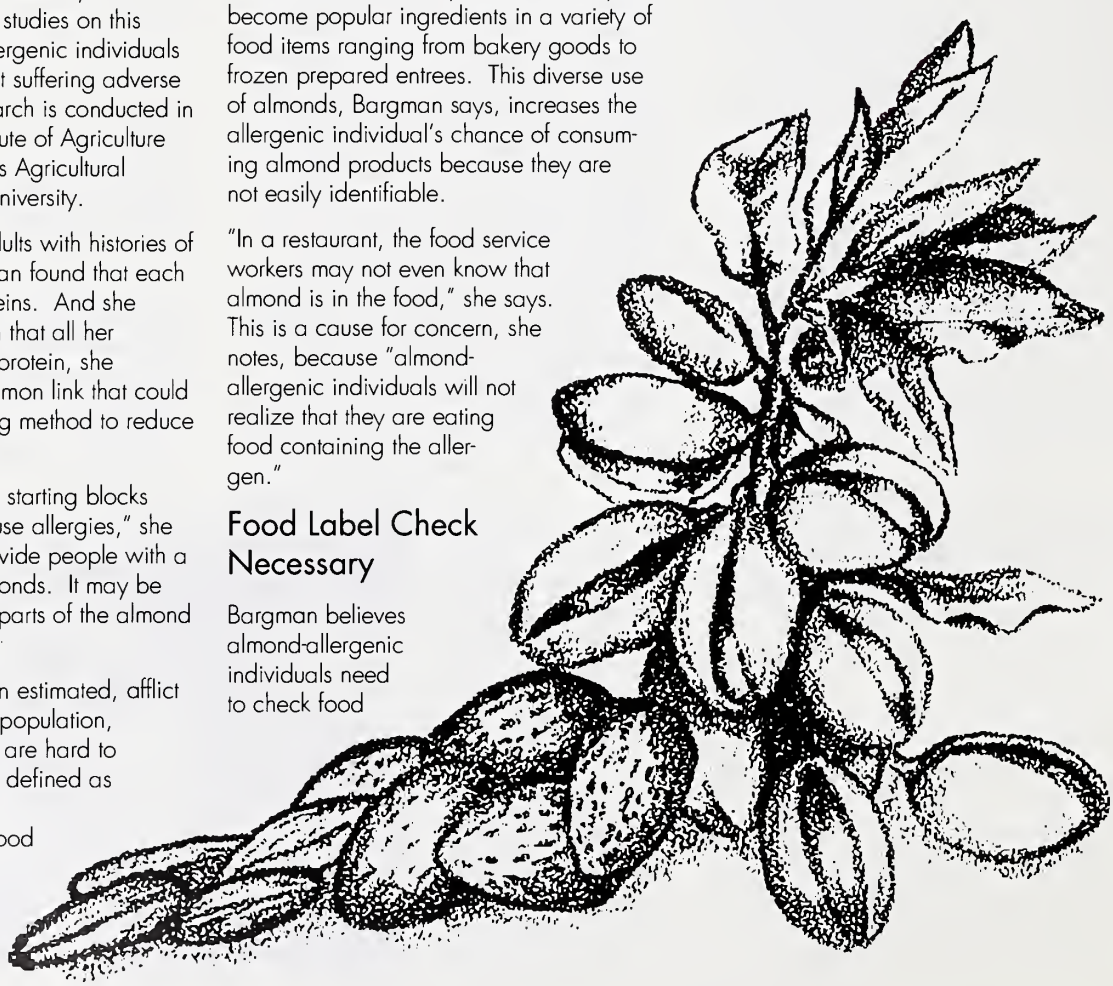
Almonds and almond products recently have become popular ingredients in a variety of food items ranging from bakery goods to frozen prepared entrees. This diverse use of almonds, Bargman says, increases the allergenic individual's chance of consuming almond products because they are not easily identifiable.

"In a restaurant, the food service workers may not even know that almond is in the food," she says. This is a cause for concern, she notes, because "almond-allergenic individuals will not realize that they are eating food containing the allergen."

Food Label Check Necessary

Bargman believes almond-allergenic individuals need to check food labels to ensure they aren't consuming even processed almonds.

"Allergenic individuals may not have a reaction the first time they consume some," she says, "but the more exposure that they have to them, the more intense the reaction can become."



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Currently, aur emphasis is on improving our ability ta cammunicate on the subject of risk because:

- Mare of the public are environmentally aware and mare sensitive to such issues as pesticide use, waste disposal, and air pallutian. This combines with increased attention and sensitivity to health issues.
- There is a continuing and growing distrust af gavernment at all levels.
- Peaple are losing faith in our scientific ability ta salve all problems. The technalagical "fix" cannot provide all the answers. Have Americans been oversold on the nation that science is a "cure-all?"

We have an obligation to help the public better understand that science is a **process**—ane that thrives an disagreement. We must alsa recagnize that science is a **value system**.

Differences When Judging Risks

Risk cammunication forces us to recognize that while we strongly support our belief system in science, we must remain aware that when judging risks large segments of the public uses a different belief system. This alternate belief system often conflicts with the science-based belief system of risk assessment.

We must learn to help the public and the experts deal with both belief systems.

Challenges Of Risk Communication

The risk cammunication task promises to became more difficult. We must help the public and the experts explore value systems. We must help them determine which risks are warthy of attention, and which risks shauld be ignored.

In aur demacratic society, the public has the right to decide which risks are worthy of attentian. But while the public has the right ta decide, far example, that all pesticide use an faad craps should stop, they also have the responsibility to understand what such a decisian ultimately would mean to them and society.

Goal: Make Issues Clear

As Extension educators, it is our responsibility to ensure that these issues are understood and discussed in open dialogue between all involved parties—the public, scientists, policymakers, and legislators. As educators, we must have strategies in place that will help individuals, families, and communities deal with complex problems. These are the complex problems associated with decisions about the wide range of risks associated with daily living.

We must attract the public and engage in risk discussion. This is not an easy challenge. We need to consider joint programming and partnerships with others in the community and with professions having different contacts—including the health profession.

Together, we can help larger segments of the population understand risk and keep it in perspective. This will, of course, require improved tools that consumers can use for making informed decisions.

Critical Need For Public Participation

Finally, we **must not move** our role from one of facilitator-educator to an advocacy role—a role where we attempt to persuade the public that we are right and they are wrong.

The public **must** participate in decisions which affect their lives. And our job is to assure that more people have access to sound education and information to help them make better decisions about risk.

In closing, let me again quote Dr. Leon Kass. He acknowledges that some of his views sound mysterious to his scientific colleagues, but, "It's not just molecules in motion that make up intelligibility. Molecules in motion do not explain the experience of grief, appetite, or fear."

Our challenge is to transform our scientific understanding of risk into forms that can be communicated, and ultimately become "intelligible," to our many publics.

*Excerpted fram the keynote presentation delivered by Myron D. Johnsrud, Administrator, Extensian Service, U.S. Department of Agriculture, at the National Risk Communication Warkshap, November 8, 1990, Denver, CO.

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